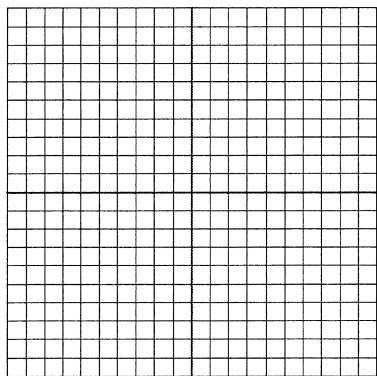


Graph the equations. State whether they are exponential growth or exponential decay.

1. $y = 3\left(\frac{4}{3}\right)^x$

growth

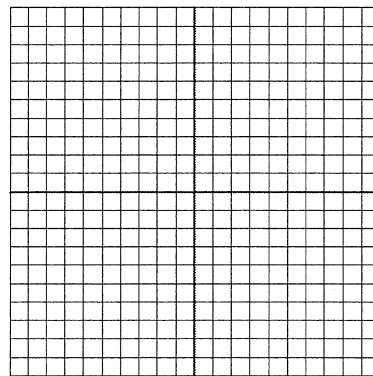
x	y
-2	1.7
-1	2.3
0	3
1	4
2	5.3



2. $y = 2^{x-1} + 3$

growth

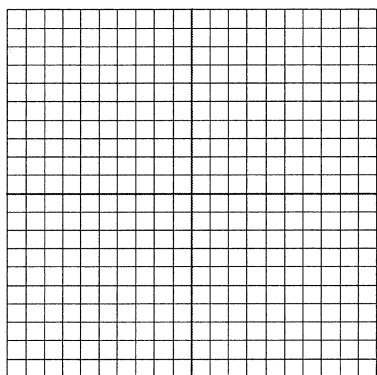
x	y
-4	3.1
-3	3.3
-2	3.5
-1	4
0	5



3. $y = -(0.2)^x$

decay

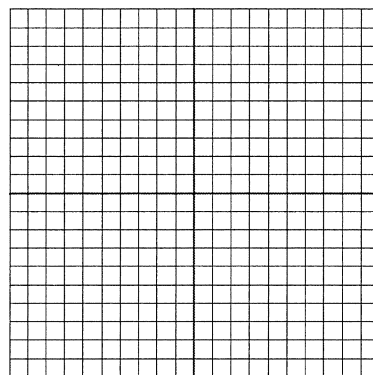
x	y
-1	-5
0	-1
1	-0.2
2	-0.04
3	-0.008



4. $y = \left(\frac{2}{3}\right)^{x-4} - 1$

decay

x	y
-2	10.4
-1	6.6
0	4.1
1	2.4
2	1.3



Simplify the expression.

5. $(2e^{3x})^3$

$8e^{9x}$

6. $e^x \cdot e^{-3x} \cdot e^4$

e^{-2x+4}

7. $\frac{4e^x}{e^{4x}}$

$4e^{-3x} = \frac{4}{e^{3x}}$

8. $\sqrt[3]{8e^{9x}}$

$2e^{3x}$

9. You deposit \$1500 into a bank account. If the account pays 3.5% annual interest, find the balance after 4 years when the interest is

a) compounded monthly

$$Y = 1500 \left(1 + \frac{.035}{12}\right)^{12 \cdot 4} = \$1725.06$$

b) compounded quarterly

$$Y = 1500 \left(1 + \frac{.035}{4}\right)^{4 \cdot 4} = \$1724.36$$

c) compounded daily

$$Y = 1500 \left(1 + \frac{.035}{365}\right)^{365 \cdot 4} = \$1725.40$$

10. You want to have \$5000 in your savings account after 3 years. Find the amount you should deposit for an account that pays 4% annual interest compounded monthly.

$$5000 = P \left(1 + \frac{.04}{12}\right)^{12 \cdot 3}$$

$$5000 = P \cdot 1.127$$

$$P = \$4436.56$$

11. You buy a new iPhone 4 for \$199. The value of the iPhone decreases by 25% each year. Write a model giving the iPhone's value after t years. Then, find the value of the iPhone after 2 years.

$$Y = 199(1 - .25)^t$$

$$Y = 199(1 - .25)^2 = \$111.94$$

12. You deposit \$3200 into an account that pays 5.5% annual interest compounded continuously. What is the balance after 5 years?

$$Y = 3200 e^{.055 \cdot 5} = \$4212.90$$

Simplify the expression.

13. ~~$7 \log_7 x$~~

X

14. $\log_6 36^x$

$$\log_6 6^{2x}$$

$$2x$$

Expand the expression.

15. $\log_4 \frac{x}{3y}$

$$\log_4 x - \log_4 3 - \log_4 y$$

16. $\ln 4x^2y$

$$\ln 4 + 2 \ln x + \ln y$$

Condense the expression.

17. $5 \log_4 2 + 7 \log_4 x + 4 \log_4 y$

$$\log_4 32x^7y^4$$

18. $\log_5 4 + \frac{1}{3} \log_5 x$

$$\log_5 4\sqrt[3]{x}$$

Use the change of base formula to evaluate the logarithm.

19. $\log_4 7$

$$1.40$$

20. $\log_8 22$

$$1.49$$

Solve the equation. Don't forget to check your answers!

21. $7^{3x+4} = 49^{2x+1}$

$$3x+4 = 4x+2$$

$$2 = x$$

22. $10^{3x} + 4 = 9$

$$10^{3x} = 5$$

$$\log_{10} 5 = 3x$$

$$x = .23$$

23. $e^{-x} = 5$

$$\ln 5 = -x$$

$$x = -1.61$$

24. $\ln(x+19) = \ln(7x-8)$

$$x+19 = 7x-8$$

$$27 = 6x$$

$$x = 9/2$$

25. $\log_5(2x-7) = \log_5(3x-9)$

$$2x-7 = 3x-9$$

$$2 = x$$

26. $\log(12x-11) = \log(3x+13)$

$$12x-11 = 3x+13$$

$$9x = 24$$

$$x = 8/3$$

27. $\log_2(x-4) = 6$

$$2^6 = x-4$$

$$2^6 + 4 = x$$

$$x = 68$$

29. $\ln(x+3) + \ln x = 1$

$$\ln x^2 + 3x = 1$$

$$e^1 = x^2 + 3x$$

28. $\log_2 x + \log_2(x-2) = 3$

$$\log_2 x(x-2) = 3$$

$$2^3 = x^2 - 2x$$

$$0 = x^2 - 2x - 8$$

$$(x-4)(x+2)$$

$$x = 4 \text{ or } x = -2$$